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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,627	04/26/2006	Alexandre Potier	0659-1001	8285
466 7590 09/22/2009 YOUNG & THOMPSON 209 Madison Street Suite 500 ALEXANDRIA, VA 22314			EXAMINER QUINLAN, RONALD A	
			ART UNIT 1794	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/541,627

Applicant(s)

POTIER ET AL.

Examiner

Ronald A. Quinlan

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-35 is/are pending in the application.
- 4a) Of the above claim(s) 30-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-893)
Paper No(s)/Mail Date 07/07/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 19-29, in the reply filed on August 31, 2009 is acknowledged.
2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

3. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Objections

4. Claim 19 is objected to because of the following informalities: "flexible" is misspelled in line 4 of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 25-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
7. Regarding Claim 25, the phrase "it comprises" renders the claim indefinite. It is unclear as to what the "it" is referring to, i.e., the thermal insulation element comprising a thermal insulation structure or the furnaces comprising a thermal insulation structure. Therefore the claim is indefinite.
8. Regarding Claims 26-28, the phrase "it" renders the claim indefinite. It is unclear as to what the "it" is referring to, i.e., the thermal insulation element comprising a thermal insulation structure or the furnaces comprising a thermal insulation structure. Therefore the claims are indefinite.
9. Regarding Claim 29, the phrase "its" renders the claim indefinite. It is unclear as to what the "its" is referring to, i.e., the thermal insulation element comprising a thermal insulation structure or the furnaces comprising a thermal insulation structure. Therefore the claim is indefinite.
10. Claims 26-29 are also dependent upon Claim 25 and are therefore rejected for the reason as noted above.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 19-21 and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by US 2002/0182387 A1 to Mercuri et al., hereinafter referred to as "Mercuri".

13. Regarding Claim 19, Mercuri teaches a multi-layer structure of flexible graphite sheets having a graded density (abstract). Mercuri teaches that the flexible graphite sheets are formed by intercalating graphite and then heating to expand the particles. These particles are then compressed to form the flexible sheets (paragraph [0049]). Mercuri teaches a top layer having a density between 0.1 and 1.4 g/cm³ and a bottom layer having a density between 1.4 and 1.8 g/cm³ (paragraph 0077). Mercuri teaches that a resin is used as a useful binder to ensure cohesiveness of the final product (paragraph [0063]) and that the layers are adjacent to each other (Figure 1). The preamble statement of a "Thermal insulation multi-layer structure" is considered to merely state the intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations and is therefore not considered a limitation and is of no significance to claim construction, see *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999).

14. Regarding Claim 20, Mercuri teaches that the resin used may be a phenolic-based resin system (paragraph [0042]).

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15. Regarding Claim 21, Mercuri teaches that the layers are brought together with contact pressure sufficient to promote substantial interfacial sheet contact by pressing between rollers (paragraph [0071] and Figures 1 and 3).

16. Regarding Claim 23, Mercuri teaches a laminate wherein two sheets of material are provided, each with a thickness of 1.0 mm (paragraph [0082]).

Therefore the overall thickness would be less than 40 mm.

17. Regarding Claim 24, Mercuri teaches a laminate wherein dense layer has a thickness of 1.0 mm (paragraph [0082]).

18. Regarding Claim 25, Mercuri teaches a multi-layer structure of flexible graphite sheets having a graded density (abstract) as described above. The preamble statement of a "Thermal insulation element designed to be fitted on furnaces operating in a non-oxidizing atmosphere and at temperatures of more than 800°C" is considered to merely state the intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations and is therefore not considered a limitation and is of no significance to claim construction, see *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999).

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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20. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

21. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

22. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0182387 A1 to Mercuri et al., hereinafter referred to as "Mercuri". The teachings of Mercuri as applied to Claims 19-21 and 23-25 as noted above in the section 102 Rejections are relied upon.

23. Regarding Claim 22, Mercuri teaches a multi-layer structure as noted above. Mercuri does not specifically teach stacking said adjacent dense and sub-dense layers with one alternation of dense and sub-dense layers.

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24. Mercuri does teach that the composite may be made of a plurality of layers, not limited to two and up to ten or more layers can be employed to advantage (paragraph [0044]). Mercuri teaches that when the composite is formed the layers will form one composite and that through combination of different layers, a desired target density may be reached and a reduction of variation in area weight may be achieved (paragraph [0044]). Mercuri also teaches that via the deliberate selection of the number of layer, further improvements may be achieved (paragraph [0044]).

25. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the laminate of Mercuri to include one alternation of dense and sub-dense layers. One of ordinary skill in the art would have been motivated to do this so that a reduction of variation in area weight is achieved and that further improvements may be achieved.

26. Claims 19-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,279,952 to Kodama et al., hereinafter referred to as "Kodama" in view of US 2002/0182387 A1 to Mercuri et al., hereinafter referred to as "Mercuri". The teachings of Mercuri as noted above in the section 102 rejections are relied upon

27. Regarding Claim 19, Kodama teaches a multi-layer thermally insulating material, comprising a graphite sheet and a carbon fiber felt sheet contacted by means of a carbonaceous binder, suitable for use in a heating furnace employing a non-oxidizing atmosphere (abstract). Kodama teaches that the graphite sheet has a density of 0.6 to 1.6 g/cm³ and that it is manufactured by extruding and

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rolling graphite powder which has been expanded by sulfuric acid treatment, i.e., compressed expanded graphite (col. 4, lines 48-54). Kodama teaches that the carbon fiber felt has a density within the range of 0.06 g/cm^3 to 0.10 g/cm^3 (col. 4, lines 27-37). Kodama teaches that the fiber felt and the graphite sheet are bonded together (col. 4, lines 16-26). Kodama further teaches that fiber felts possess desirable properties for insulation, but also possess problems which are improved via addition of a graphite sheet, including self-standing properties, fluff or nap of the felt, and tightness to the outer surface of the felt (col. 1, line 34 col. 3, line 25).

28. Kodama does not specifically teach that the thermal insulation multi-layer structure comprises one layer based on compressed expanded graphite particles with a density between 0.5 and 1.6 g/cm^3 and a second layer based on compressed expanded graphite particles with a density between 0.05 and 0.3 g/cm^3 .

29. Mercuri teaches a multi-layer structure of flexible graphite sheets having a graded density (abstract). Mercuri teaches a top layer having a density between 0.1 and 1.4 g/cm^3 and a bottom layer having a density between 1.4 and 1.8 g/cm^3 (paragraph 0077).

30. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the thermal insulation multi-layer structure of Kodama in view of the grade density graphite sheets of Mercuri. One of ordinary skill in the art would have been motivated to do this for the purpose of reducing

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the fluff or nap associated with felt and to provide a flexible, self-standing material associated with graphite sheets as taught by Kodama.

31. Regarding Claim 20, Kodama teaches that the layers are bonded to each other by means of a carbonaceous binding agent (col. 4, lines 23-24) and that typical suitable resins are phenolic resins, epoxy resins and furan resins (col. 5, lines 24-26).

32. Regarding Claim 21, Kodama teaches that the structure must be bonded with a high adhesive strength without any separation between layers (col. 6, lines 30-34). This interpreted to mean that the bonding occurs over the entire contact surface.

33. Regarding Claim 22, Kodama teaches that the insulating materials also includes those of sandwich constructions wherein one or more graphite sheets are interposed as reinforcing sheets between layers of carbon fiber felt for use in ceilings of horizontal furnaces and in parts which must support loads (col. 6, lines 53-58).

34. Kodama does not specifically teach that the structure is obtained by stacking the adjacent layers with one alternation of layers.

35. However, it would have been obvious to one of ordinary skill in the art to utilize one alternation. One of ordinary skill in the art would have been motivated to do this in the development of a sandwich construction for use in ceilings or parts which must support loads.

36. Regarding Claim 23, Kodama teaches a thickness of 5-25 mm for the sub-dense carbon fiber felt layer.

37. Kodama does not specifically teach the sub-dense layer being comprised of compressed expanded graphite.

38. Mercuri teaches a multi-layer structure of flexible graphite sheets having a graded density (abstract) as noted above. Mercuri teaches a top layer having a density between 0.1 and 1.4 g/cm³ and a bottom layer having a density between 1.4 and 1.8 g/cm³ (paragraph 0077).

39. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the multi-layer structure of Kodama via the graded density graphite layers of Mercuri. One of ordinary skill in the art would have been motivated to do this for the purpose of reducing the fluff or nap associated with felt and to provide a flexible, self-standing material associated with graphite sheets as taught by Kodama. One of ordinary skill in the art would have found it obvious to have the sub-dense layer of graphite sheet be of the same thickness as taught by Kodama because both layers are of the lower density.

40. Regarding Claim 24, Kodama teaches that the thickness of the graphite sheet is less than 1 mm, preferably from 0.5 mm to 0.2 mm (col. 5, lines 3-4).

41. Regarding Claim 25, Kodama in view of Mercuri teaches a thermal insulation element for use on a furnace operated in a non-oxidizing environment as noted above. Kodama further teaches that the furnace is operated at a temperature up to 1,400°C (col. 8, lines 53-59).

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42. Regarding Claim 26, Kodama further teaches that the insulating materials are used on the inner wall surfaces of high-temperature heating furnaces (col. 1, lines 17-20).

43. Regarding Claim 27, Kodama teaches that the use of bricks of material are commonly used in the insulation materials for the inner walls (col. 1, lines 17-24).

44. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the thermal insulation material of Kodama in view of Mercuri as a thermal insulation brick. One of ordinary skill in the art would have been motivated to do this for the purpose of reducing the fluff or nap associated with felt and to provide a flexible, self-standing material associated with graphite sheets as taught by Kodama.

45. Regarding Claim 28, Kodama teaches a cylindrical structure (Figures 1, 3 and 7).

46. Regarding Claim 29, Kodama teaches that the dense graphite sheet constitutes the inner wall surface of a furnace (col. 7, lines 4-10) and has a density of 0.6 to 1.6 g/cm³.

Conclusion

47. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald A. Quinlan whose telephone number is (571) 270-1149. The examiner can normally be reached on Monday to Thursday from 6:30am-4:30pm Eastern.

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48. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

49. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. A. Q./
Ronald A. Quinlan
Patent Examiner, Art Unit 1794
September 14, 2009

/JENNIFER MCNEIL/
Supervisory Patent Examiner, Art Unit 1794